DOCUMENT RESUME

ED 195 487 SO 013 020

AUTHOR Johnson, William S.; Morris, David C.
TITLE The Effects of Computer Oriented Student Research.
SPONS AGENCY National Science Foundation, Washington, D.C.
PUB DATE 80
GRANT SER-7900046
NOTE 19p.; Paper presented at Annual Meeting of the CUFA session at National Council for the Social Studies (New Orleans, LA, November 26-29, 1980). Tables may not reproduce clearly due to faint print.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Case Studies; Comparative Analysis; *Computer Assisted Instruction; Conventional Instruction; *Course Evaluation; Educational Research; Educational Technology; Higher Education; Literature Reviews; *Sociology; *Student Attitudes; Student Participation; *Student Research; Tables (Data); *Teaching Methods

ABSTRACT

This paper assesses the impact of computer based research activities on attitudes of students in an introductory sociology course at Ball State University toward sociology and toward course activities. Special emphasis is placed on attitude differences when research activities are incorporated on a voluntary or required basis. The objective is to provide insight into one aspect (i.e., student attitudes based on various types of experience with computer research) of the role of computer based technology in the shift in teaching methods in colleges and universities in the United States from lecture and textbook approaches to approaches based on more active student participation. The method involved surveying students regarding their attitudes toward having small research group meetings once a week instead of four lectures per week. Findings indicated that student attitudes toward computer research activities were more closely related to whether there was a choice about participating in the activities than they were to the activities themselves. Specifically, findings indicated that negative attitudes emerged when research activities were mandatory for the entire sociology class or for a selected group of students and that positive attitudes resulted when students participated in the activities by choice. Further, students in the mandatory research group found the computer activities difficult, indicated a high degree of anxiety about the course, disliked sociology, and recommended that research activities involving computers be dropped. The conclusion is that students will master computer skills more easily and react more positively toward computer based research activities when they are given the option of whether to participate in such activities. (DB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED195487

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
William S. Johnson
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

THE EFFECTS OF COMPUTER ORIENTED STUDENT RESEARCH

SP 013 020

William S. Johnson
David C. Morris
Department of Sociology, Ball State University
Muncie, Indiana 47306

Not for quotation or attribution
without permission of the authors

*This material is based upon work supported by the National Science Foundation, Grant No. SER-7900046.

INTRODUCTION

Throughout American colleges and universities, one can detect a shift in pedagogical methods from the more passive lecture - textbook learning approach to more active, student participation in the learning process. A major component of this change entails the use of computerbased technology.

The Department of Sociology at Ball State University, recognizing the importance of active student participation in the learning process, has supported the authors' efforts to design and implement computeroriented research throughout its curriculum. This paper presents finding based on an analysis of data derived from a year long study of the impact of student-oriented computer based research on student attitudes toward the subject and course activities. Special emphasis is placed on the effect of different modes of incorporating the activities into large sections of Introductory Sociology.

DISCUSSION

Computers have become an indispensible tool in the sciences and thus an understanding of social science also requires some knowledge of computer-oriented data analysis. Indeed, there are those who contend that some degree of competence in computer use and data analysis is necessary to avoid a new form of functional illiteracy.

For example, Molnar (1978) cites Michael's argument from The Unprepared Society which states that: "Ignorance of computers will render people as functionally illiterate as ignorance of reading, writing, and arithmetic." If for no other reason, computer literacy is becoming required in a modern society to qualify students to become informed citizens (Austing, 1978; Hopper, 1980; Schimming, 1980). Molnar (1978) notes that at some schools such as Dartmouth, the computer is almost as important to students as is the library. This computer orientation is not only occuring at larger universities, but is being or has been implemented at smaller colleges as well (Falk and Cortese, 1974).

One of the recommendations of the Sociology Panel (from the National Academy of Science and the Social Science Research Council Study) is that empirical research should be a part of undergraduate teaching from the start (Rhoades, 1978). Pedagogically, having students participate in the research process alters the teaching approach from one based on passive learning to an active learning schedule. Programatically, this research experience may provide students with marketable skills especially if they have some knowledge of computers and software routines such as the Statistical Package for the Social Sciences or "SPSS" (St. George, 1978).

There is a need then, to encourage students to take a more active role in the education process through the use of research (Comer, 1979). Additionally, since so much of contemporary research is implemented by computers, it is necessary for the student to gain familiarity with the role of computers in data analysis. Parker (1976) contends that many students major in the social sciences because they are afraid of what they perceive as more "scientific" and "empirical" methods found in the natural sciences and thus feel, that a social science major allows them to avoid these activities. This outlook becomes a self-fulfilling prophecy and a mental block which is difficult to overcome. This "fear" of or reluctance to participate in research-oriented activity is a problem that has been commented on by other scholars as well (Baer and Jewel, 1979; Davis, 1978).

Davis (1978) has argued that sociology courses are in reality about the discipline of sociology and do not deal with society and how it works. Most students of sociology have gained little or no empirical information about the topics which are covered. Contemporary students need greater contact with the process and data analysis if they are to understand the workings of society. This argument is gaining greater currency throughout the social and behavioral sciences, including sociology.[1]

One of the major benefits of using the computer is direct student involvement

with "real data" in a less threatening environment (such as the General Social Survey or data from the Center for Political Studies) which enhances students' understanding of the theory, practices and uses of survey data and analysis (St. George. 1978). Through active participation, students learn not only substantive material, but come to understand and appreciate the research methods of the discipline for which they were collected (Baer and Jewel, 1979).

There is some evidence that course related research endeavors are positively received by the student audience (Yoder, 1979). Cutler (1973) found that in Introductory Sociology, student-oriented research improved reactions to the course. Students found research related exercises to be worthwhile, with a greater proportion enjoying the exercises more than the course itself; in fact, many who were "undecided" became positively oriented after their research experience (Parker, 1976). Conklin (1976) states that in his opinion, students will find programmed research exercises non-threatening and highly interesting.

The following discussion describes a project which has implemented student-oriented computer-based research activities in Introductory Sociology at Ball State University. More specifically, during the academic year 1979-80, three different techniques of incorporating student research activities were introduced. The different effects of the three techniques on student attitudes are presented in the findings of this article. The specific research question addresses the following issue: How does voluntary or mandatory participation affect student attitudes toward the research component?

---

[1]For example, if one examines a few of the papers presented at the National Educational Computing Conference in 1979 and 1980, we find titles such as: (1979) "Teaching Statistics and Using the Computers" (Robert Oberg and Kenneth Preskenis) "The Use of Census Data Analysis to Enhance the Sociology Curriculum" (Harold Peneson and Steven Just)"
"A Computer-Based Laboratory for General Statistics" (R.S. Cunningham)
"Teaching Demography Through the Computer" (Steven Stack)
(1980) "Turning Students on to the Computer: The Introductory Course" (Gary B. Shelly)

PROJECT DESIGN

The authors developed a system of Computer Assisted Instruction (CAI) and an SPSS save file based on the General Social Survey or "GSS" (National Opinion Research Center, 1978) for use by students participating in the research activities.

The project design took place over a period of 15 months (June 1979-August 1980). This time frame was divided into four developmental stages of three months each. The CAI files, SPSS Save Files and related materials were developed in the first stage (June-August 1979).

A series of handouts were created which provided such information as:

1. Sociology Research Clinic Staff and office hours.
2. Location and availability of peripheral terminals.
3. A list of GSS variables available for analysis.
4. Basic information on how to log-on, log-off the computer.
5. How to access the first information file which contained procedures and instructions on accessing and using the CAI lessons.

The CAI lessons were designed to acquaint the participants with a general research paradigm, which focused on such topics as: development of the research question, statement of hypothesis, operationalization, use of SPSS, and rudimentary statistical procedures. All students participating in the research activities were required to submit written materials that demonstrated their abilities to read and interpret tabular data obtained through SPSS analysis of GSS data. A major objective of this project has been an evaluation of the effects of the three different research approaches. To measure these effects, an evaluation instrument was administered at the end of each term.

During the 1979-80 academic year, the Department of Sociology offered a large section of Introductory Sociology each quarter. The class met three days a week in a large lecture hall for formal lectures presented by three faculty

members who were team teaching the course. A fourth hour was devoted to smaller discussion sections which were conducted by the three faculty members with the assistance of graduate research students.

The project design incorporated three different treatments: 1) In the Fall Quarter (Fall Treatment), a group of students were randomly selected to participate in the research activities. These students were given no choice in the selection process and were aware of the fact that their research activities were different from the activities of others in the class; 2) The second treatment was introduced during the Winter Quarter (Winter Treatment). Students were given the choice as to whether or not they wished to participate in the research activities; 3) The third treatment was implemented in the Spring Quarter (Spring Treatment). In this instance, all students were required to participate in the research activities.

FINDINGS

The following discussion compares the three treatment groups. The Fall Treatment consists of a randomly selected group of students who had no choice about participation in the research activities; the Winter Treatment was composed entirely of volunteers and; the Spring Treatment research group meetings instead of four lectures per week.

(Table 1 here)

The Fall group expresses the least preference for and the greatest dislike of the research group meetings. The Winter and Spring Treatment groups are identical in that they overwhelmingly like the research group meetings. Students, both Winter and Spring express relatively low levels of dislike compared to the Fall Treatment group.

This suggests that when research activities are mandatory for a selected group, negative attitudes emerge. These negative feelings may result from a

sense of relative deprivation. That is, they are being forced to participate in tasks that are not required of other class members who are in conventional (non-research) discussion group sections. Undoubtedly, self-selection plays a role in the Winter Treatment group in that they were all volunteers. Thus it is expected that participants should have more favorable responses. In the Spring, everyone was required to participate and thus had no other reference group to which they could make invidious comparisons.

Table 2 summarizes the attitudes of the three treatment groups concerning the activities conducted in their research sections.

(Table 2 here)

Again, in the Fall, a small minority liked the activities while a large majority expressed dislike. A clear majority of the Winter Treatment liked the research tasks while in the Spring, the group was more evenly divided although over twice as many expressed a positive evaluation when compared to the Fall.

It should be further noted that in the Fall, there was very little ambivalence in attitudes; there was either clear like or dislike for the research activities in that context. The percentage of those liking the research tasks declined from Winter to Spring which suggests that a considerable number of people in the Spring section would not have opted for that alternative if given a choice.

Table 3 contains data pertaining to attitudes about learning how to use the computer.

(Table 3 here)

The data for Fall reinforces the negative impact of random selection and compulsory participation. A minority of the Fall students liked learning how to run a computer; a majority disliked that activity. In the Winter, a large majority evinced a positive response while in the Spring, a smaller majority was favorable toward the computer activities.

The previously mentioned sense of relative deprivation for the Fall group contributes to the negative responses in that those in the conventional discussion groups did not work with the computer. That is, the Fall researchers felt that they were being subjected to unfair and excessive course requirements in comparison to their classmates.[1]

Students were asked about their interest in the topics covered in the research groups compared to other courses taken at the University. In Table 4, the data indicates that a majority of the Winter group expressed more interest and the largest percentage of the Spring group rated their interest as "Average." Although a smaller percentage of the Spring group expressed more interest as compared to Fall, they were still substantially lower on the "Less" evaluation.

(Table 4 here)

The student researchers were also asked to evaluate the usefulness of what they had learned in their research sections compared to other courses taken at the university.

(Table 5 here)

Table 5 shows that the majority of the Fall Treatment group felt that they had learned less: a majority of the Winter group felt that they had learned more. The largest percentage of the Spring group responded that they had learned less, although they had the largest percentage of the three groups indicating average usefulness.

The student researchers were asked if they recommended dropping the research component of the course. The data in Table 6 indicates that a majority of the Fall group recommended dropping the research activities; a very large majority of the Winter group did not recommend deletion, and the largest per-

[1] Consultation with colleagues who were conducting the conventional discussion group indicated that in fact, the discussion groups had greater course work requirements.

centage of the Spring group did not recommend eliminating those activities. This suggests that the optimal condition is one in which students are allowed to choose between options.

(Table 6 here)

In the Fall Quarter, one of the research requirements was the writing of a brief five-page paper which presented the findings of each student's research activities. We found that even this short five-page paper precipitated great anxiety on the part of the students. Based upon the Fall Quarter evaluations this requirement was replaced in the Winter and Spring quarters with more structured week by week sets of exercises. The Winter and Spring Quarter evaluations indicated that, in fact, the revised format eliminated the apprehension elicited by the paper writing approach.

After reviewing the various approaches used during the academic year (1979-80), the authors have developed a more detailed and systematic workbork modeled after those used in introductory Biology and Physics, and have substituted SCSS (which is an interactive version of SPSS) for SPSS. This latter modification, based on Summer Quarter (1980) experiences, is even more student oriented, less threatening, and is a computer skill more easily mastered by student researchers.

CONCLUSIONS

The data from the three quarters suggest that voluntary participation by student researchers produces a much more favorable response in terms of their attitudes and evaluations of the course related tasks and activities. Conversely, compulsory involvement in the research activities produced for less favorable attitudes.

This latter point is especially true when one group is selected to conduct a research project and their classmates are in conventional, nonresearch discussion groups. Those who are assigned to the research groups appear to

develop a strong, negative reaction that results from a sense relative deprivation. These students feel that they are being coerced into a threatening course requirement that is not being required of others in their class and that they are putting forth more work than are their colleagues. While research requirements were in fact less demanding, the attitude none the less prevailed as a definition of the situation. The class in which all members took part in the research activities generally exhibited attitudes which fell between the extremes of voluntary and random mandatory participation.

In conclusion, these findings suggest that for student research to have optimal positive impact on attitudes toward such activities the student should be given the option of participating. Forcing students to participate seems to have more negative than positive implications. If students are provided with adequate incentives in a non-threatening manner, the voluntary format should recruit a considerable number of interested participants.

Students react more favorably to the SCSS statistical package in conjunction with the exercise workbook. The SCSS system does not require that they learn elaborate text editing procedures to accomplish their data analysis and the workbook provides more concrete structure and direction in the form of weekly exercises.

BIBLIOGRAPHY

Austing, R. H. A study of computer report on society and computer literacy courses and materials. Educational Technology Systems, 1978-79, 7, 267-274.

Baer, M. A. & Jewel, M. E. Methods without madness: relating methodologies to substance in a data lab course. Teaching Political Science, 1979, 6, 375-384.

Benenson, H. & Just, S. The use of census data analysis to enhance the sociology curriculum. Proceedings of the National Education Computing Conference, 1979, 1, 221-226.

Comer, J. Computer use-research exercises: some suggested procedures for undergraduate political science. Teaching Political Science, 1979, 6, 479-489.

Conklin, H. Using the computer in introductory sociology: a solution to the methodology problem. Teaching Sociology, 1976, 4, 83-95.

Cunningham, R. S. A computer-based laboratory for general statistics. Proceedsing of the National Education Computing Conference, 1979, 291-296.

Culter, S. J. Current and retrospective student evaluations of a computer based research curriculum in an introductory sociology course. Proceedings of the Fourth Conference on Computers in the Undergraduate Curricula, 1973, 236-238.

Davis, J. A. Teaching social facts with computers. Teaching Sociology, 1979, 5, 235-258.

Falk, R. F. & Cortese, C. F. How to state a sociology computer laboratory in a small college. Teaching Sociology, 1978, 5, 295-302.

Hopper, J. A. A bite of basic. Proceedings of NECC/2: National Educational Computing Conference 1980, 62-64.

Molnar, A. R. The next great crisis in american education: computer literacy. Educational Technology Systems. 1978-79, 7, 275-281.

National Opinion Research Center. General Social Surveys, 1972-1978: Cumulative Codebook. University of Chicago: Author, 1978.

Nie, Norman H. et. al Statistical Package for the Social Sciences (2nd ed.) New York: 1975

Oberg, R. & Preskenis, K. Teaching Statistics and Using Computers. Proceedings of the National Education Computing Conference, 1979, 297-300.

Rhoades, L. J. News from project on teaching undergraduate sociology. Teaching Sociology, 1978, 5, 295-302.

Schimming, B. B. A case for information literacy. Proceedings of NECC/2: National Educational Computing Conference 1980, 1980, 58-61.

St. George, A. A computer-integrated course in research methods. Teaching Sociology. 1978, 5, 423-444.

Stack, Steven. Teaching demography through the computer. Proceedings of the National Education Computing Conference. 1979, 1, 211-220.

Yoder, Jan. Teaching students to do research. Teaching of Psychology. 1979, 6, 85-88.

BEST COPY AVAILABLE

TABLE 1

Percentage Distribution of Student Attitudes Toward Having Small Research Group Meetings Once a Week Instead of Four Lectures per Week by Treatment.

	ATTITUDE			
TREATMENT	Like %	No Opinion %	Dislike %	N
Fall	44.0	17.0	39.0	46
Winter	75.0	20.0	5.0	61
Spring	75.0	14.0	11.0	319
$X^2 = 33.92$	d.f. = 4	$p < .001$	TOTAL	426

BEST COPY AVAILABLE

TABLE 2

Percentage Distribution of Student Attitudes About Their Research Activities by Treatment

	ATTITUDE			
TREATMENT	Like %	No Opinion %	Dislike %	N
Fall	20.0	2.0	78.0	46
Winter	64.0	26.0	10.0	53
Spring	43.0	22.0	35.0	318
$X^2 = 52.60$	d.f. = 4	$p < .001$	TOTAL	417

BEST COPY AVAILABLE

TABLE 3

Percentage Distribution of Student Attitudes About Learning How To Use A Computer By Treatment

	ATTITUDE			
TREATMENT	Like %	No Opinion %	Dislike %	N D
Fall	37.0	9.0	54.0	46
Winter	89.0	8.0	3.0	64
Spring	63.0	13.0	24.0	318
χ^2 = 41.84	d.f. = 4	p <.001	TOTAL	428

BEST COPY AVAILABLE

TABLE 4

Percentage Distribution of Student Interest in Their Research Activities Compared to Other Courses Taken at BSU by Treatment

	INTEREST			
TREATMENT	More %	Average %	Less %	N
Fall	29.0	18.0	53.0	45
Winter	51.0	35.0	14.0	63
Spring	23.0	42.0	35.0	319
$X^2 = 32.96$	d.f. = 4	$p < .001$	TOTAL	427

BEST COPY AVAILABLE

TABLE 5

Percentage Distribution of Student's Perceived Usefulness of Research Activities Compared to Other Courses Taken at BSU by Treatment

	USEFULNESS			
TREATMENT	More %	Average %	Less %	N
Fall	25.0	23.0	52.0	44
Winter	55.0	29.0	16.0	62
Spring	24.0	34.0	42.0	323
$X^2 = 30.48$	d.f. = 4	$p < .001$	TOTAL	429

BEST COPY AVAILABLE

TABLE 6

Percentage Distribution of Student's recommending Dropping the Research Activities By Treatment

	DROP RESEARCH			
TREATMENT	Recommend %	Not Sure %	Not Recommend %	N
Fall	56.0	18.0	26.0	45
Winter	3.0	6.0	91.0	64
Spring	33.0	20.0	47.0	319
$X^2 = 56.55$	d.f. = 4	$p < .001$	TOTAL	428